

**MICRO-FABRICATED OPTICAL WAVEGUIDE
FOR USE IN SCANNING FIBER DISPLAYS AND
SCANNED FIBER IMAGE ACQUISITION**

Abstract of the Disclosure

- 5 Small, rugged scanners micro-fabricated from commercial optical fibers to
form waveguides or other structures. The scanning waveguide has a distal portion on
which is formed a non-linear taper with a diameter that decreases toward a distal end.
Optionally, a hinge portion having a reduced diameter can be formed in the distal
10 portion, improving the scanning properties of the waveguide. A micro-lens can be
integrally formed at the distal tip of the waveguide with either a droplet of an optical
adhesive, or by using an energy beam to melt the material of the waveguide to form a
droplet. The droplet is shaped with an externally applied force. When mechanically
driven in vibratory resonance, the tip of the optical waveguides moves in linear or
two-dimensional scan patterns of relatively high amplitude and frequency, and large
15 field of view. The scanner can be used either for image acquisition or image display.